

What is claimed is:

1. A pointing apparatus using a piezoelectric film, the apparatus comprising:

a plurality of first strips arranged in a first direction at a first predetermined interval, each of which is extended in a second direction perpendicular to the first direction and at least some of the plurality of first strips is touched when a pointer is moved in the first direction; and

a plurality of second strips, which are lapped over the plurality of the first strips and arranged in the second direction at a second predetermined interval, each of which is extended in the first direction and at least some of the plurality of second strips is touched when the pointer is moved in the second direction,

wherein each of the first and second strips generates electric charges in a quantity corresponding to pressure applied when a respective one of each of the first and second strips is touched and outputs touch signals having levels corresponding to the quantity of the electric charges, and moving direction and amount of movement of the pointer are determined by the number of times and the order in which the touch signals are generated.

2. The apparatus of claim 1, wherein each of the first and second strips is a piezoelectric film formed of polyvinylidene fluoride (PVDF).

3. A method for producing a pointing apparatus using a piezoelectric film, the apparatus comprising a plurality of first strips arranged

in a first direction at a first predetermined interval, each of which is extended in a second direction perpendicular to the first direction and at least some of the plurality of first strips is touched when a pointer is moved in the first direction; and a plurality of second strips, which are lapped over the plurality of the first strips and arranged in the second direction at a second predetermined interval, each of which is extended in the first direction and at least some of the plurality of second strips is touched when the pointer is moved in the second direction, wherein each of the first and second strips generates electric charges in a quantity corresponding to pressure applied when a respective one of each of the first and second strips is touched and outputs touch signals having levels corresponding to the quantity of the electric charges, and moving direction and amount of movement of the pointer are determined by the number of times and the order in which the touch signals are generated, the method comprising the steps of:

forming part of the first strips in a first layer, forming the remainder of the first strips in a second layer, forming part of the second strips in a third layer, and forming the remainder of the second strips in a fourth layer;

interlacing the second layer with the first layer to form the first strips in a common layer, and interlacing the fourth layer with the third layer to form the second strips in another common layer;

lapping the common layer having the first strips over the common layer having the second strips so that the first strips perpendicularly intersect the second strips; and

housing the lapped-over layers.

4. A method for producing a pointing apparatus using a piezoelectric film, the apparatus comprising a plurality of first strips arranged in a first direction at a first predetermined interval, each of which is extended in a second direction perpendicular to the first direction and at least some of the plurality of first strips is touched when a pointer is moved in the first direction; and a plurality of second strips, which are lapped over the plurality of the first strips and arranged in the second direction at a second predetermined interval, each of which is extended in the first direction and at least some of the plurality of second strips is touched when the pointer is moved in the second direction, wherein each of the first and second strips generates electric charges in a quantity corresponding to pressure applied when a respective one of each of the first and second strips is touched and outputs touch signals having levels corresponding to the quantity of the electric charges, and moving direction and amount of movement of the pointer are determined by the number of times and the order in which the touch signals are generated, the method comprising the steps of:

forming all the first strips in a fifth layer and forming all the second strips in a sixth layer;

lapping the fifth layer over the sixth layer so that the first strips perpendicularly intersect the second strips; and

housing the lapped-over layers.

5. The apparatus of claim 1, further comprising:

a signal converting portion for converting the touch signals generated from the first strips into first square waves, outputting the square waves as first information signals, converting the touch signals generated from the second strips into second square waves, and outputting the second square waves as second information signals;

a first direction detecting portion for checking an order in which the first information signals are generated, and detecting a component of the first direction of the moving direction from the checked order; and

a second direction detecting portion for an checking order in which the second information signals are generated, and detecting a component of the second direction of the moving direction from the checked order; and

wherein the moving direction corresponds to the pointing information.

6. The apparatus of claim 5, further comprising:

a first movement amount detecting portion for measuring the number of times in which the first information signals are generated in each predetermined time period, and outputting the number of times as the amount of movement of the first direction; and

a second movement amount detecting portion for measuring the number of times in which the second information signals are generated in each predetermined time period, and outputting the number of times as the amount of movement of the second direction; and

wherein the amount of movement corresponds to the pointing information.

7. The apparatus of claim 6, further comprising a radio frequency signal converting portion for converting the moving direction and the amount of movement, which are input from the first and second direction detecting portions and from the first and second movement amount detecting portions, respectively, into a radio frequency signal, and outputting the radio frequency signal.

8. The apparatus of claim 6, wherein the signal converting portion comprises:

a first comparing part for comparing each of levels of the touch signals generated from the first strips with a reference voltage and outputting the results of comparison as the first information signals; and

a second comparing part for comparing each of levels of the touch signals generated from the second strips with the reference voltage and outputting the results of comparison as the second information signals.

9. The apparatus of claim 6, wherein the first direction detecting portion comprises:

a first order storing part for storing the order in which the first information signals are generated when the first strips are touched in the first direction or the reverse direction of the first direction; and

a third comparing part for comparing the order in which the first information signals are presently generated, with the order in which the first information signals were previously generated and which are read from the first order storing part, and detecting the component of the first direction of the moving direction from the result of comparison.

10. The apparatus of claim 6, wherein the second direction detecting portion comprises:

a second order storing part for storing the order in which the second information signals are generated when the second strips are touched in the second direction or the reverse direction of the second direction; and

a fourth comparing part for comparing the order in which the second information signals are presently generated, with the order in which the second information signals were previously generated and which are read from the second order storing part, and detecting the component of the second direction of the moving direction from the result of comparison.

11. The apparatus of claim 6, wherein the first movement amount detecting portion comprises:

a first ORing unit for performing an OR operation of the first information signals and outputting the result of OR operation; and

a first counter for performing a counting operation in response to the result of the OR operation input from the first ORing unit and outputting the

result of counting in each predetermined time period as the amount of movement of the first direction.

12. The apparatus of claim 6, wherein the second movement amount detecting portion comprises:

a second ORing unit for performing an OR operation of the second information signals and outputting the result of the OR operation; and

a second counter for performing a counting operation in response to the result of the OR operation input from the second ORing unit and outputting the result of counting in each predetermined time period as the amount of movement of the second direction.

13. A method for detecting pointing information of a pointing apparatus using a piezoelectric film, the apparatus comprising a plurality of first strips arranged in a first direction at a first predetermined interval, each of which is extended in a second direction perpendicular to the first direction and at least some of the plurality of first strips is touched when a pointer is moved in the first direction; and a plurality of second strips, which are lapped over the plurality of the first strips and arranged in the second direction at a second predetermined interval, each of which is extended in the first direction and at least some of the plurality of second strips is touched when the pointer is moved in the second direction, wherein each of the first and second strips generates electric charges in a quantity corresponding to pressure applied when a respective one of each of the first and second strips is touched and

outputs touch signals having levels corresponding to the quantity of the electric charges, and moving direction and amount of movement of the pointer are determined by the number of times and the order in which the touch signals are generated, the method comprising the steps of:

(a) converting the touch signals generated from the first strips into first square waves to obtain the first information signals and converting the touch signals generated from the second strips into second square waves to obtain the second information signals; and

(b) checking the order in which the first and second information signals are generated and detecting the components of the first and second directions from the checked order.

14. The method of claim 13, wherein in step (b), the numbers of times in which the first and second information signals are generated in each predetermined time period are measured, and the numbers of times are determined as the amounts of movement of the first and second directions, respectively.